FabaceaeCPea family

Cladrastis kentukea (Dum.-Cours.) Rudd

yellowwood

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Synonym. *Cladrastis lutea* (Michx. f.) K. Koch

Other common names. Kentucky yellowwood, virgilia, American yellowwood.

Growth habit, occurrence, and use. YellowwoodC*Cladrastis kentukea* (Dum.-Cours.) RuddCis a small deciduous tree that attains a height of 12 to 18 m at maturity (Sargent 1965). The native range of yellowwood is restricted; it extends from western North Carolina into eastern and central Tennessee, northern Alabama, Kentucky, southern Illinois, and Indiana; it also occurs in the glades country of southwestern Missouri and in central and northern Arkansas. Locally, it grows on limestone cliffs in rich soils, and its greatest abundance is in Missouri and in the vicinity of Nashville, Tennessee. The wood is hard, close-grained, and bright yellow, turning to light brown on exposure to light; commercially, it is a substitute for walnut in gunstocks and a source of clear yellow dye. Yellowwood is hardy as far north as New England and is often planted for its ornamental value. It was introduced into cultivation in 1812 (Olson and Barnes 1974).

Flowering and fruiting. The fragrant, perfect, white, showy flowers bloom in June, usually in alternate years, and the fruit ripens in August or September of the same year (Bailey 1949; Radford and others 1964; Sargent 1965). The fruit is a legume (pod), 7.5 to 10 cm long (figure 1) (Fernald 1950), that falls and splits open soon after maturing. The seeds are dispersed by birds and rodents. Each legume contains 4 to 6 short, oblong, compressed seeds with thin, dark brown seedcoats and without endosperm (figure 2). Weights of seeds in legumes containing 2 to 4 seeds decreased from the base of the legume to the style (Harris 1917). Good seed crops are produced generally in alternate years.

Collection of fruits. The legumes may be collected soon after maturity by handpicking them from trees or by shaking or whipping them onto outspread canvas or plastic sheets. Legumes turn brown and split open easily at maturity.

Extraction and storage of seeds. After the legumes are allowed to dry, they can be opened by beating them in sacks or running them through a macerator. The seeds may be separated from the legume remnants with screens or air separators.

Cleaned seeds average about 24,900 to 32,200/kg (11,300 to 14,600/lb). Average purity and soundness of seeds from commercial sources have been, respectively, 82 and 67% (Olson and Barnes 1974). Seeds of yellowwood are orthodox in storage behavior and may be stored dry in sealed

containers at 5 °C (Olson and Barnes 1974). For overwinter storage, seeds may be stratified in sand or a mixture of sand and peat (Olson and Barnes 1974), or they may be dried and sown the following spring (Wyman 1953).

Pregermination treatments. Natural germination of yellowwood is epigeal (figure 3) and takes place in the spring following seedfall. Dormancy is chiefly caused by an impermeable seedcoat and to a lesser degree by conditions in the embryo (Burton 1947). Burton (1947) found that shaking yellowwood seeds for 20 minutes at 400 strokes per minute made 82% of the seed permeable to water. A successful dormancy-breaking treatment is sulfuric acid scarification for 30 to 60 minutes (Heit 1967). Dormancy may be overcome also by stratification in sand or sand and peat for 90 days at 5° C or by scarification and storage for 30 days (Olson and Barnes 1974).

An early method of overcoming dormancy includes soaking the seeds in water that is nearly at the boiling point (Jenkins 1936). The water should be preheated to 71 to 100 °C at the time the seeds are immersed; the heating element is then removed and the seeds are allowed to soak and cool for 12 to 24 hours in water (Heit 1967).

Germination tests. There are no official test prescriptions for yellowwood. Germination has been tested on pretreated seeds in sand or sand and peat flats in 30 to 42 days at 20 to 30 °C (Olson and Barnes 1974) and on moist filter paper medium for 24 days at 0, 25, and 50 °C (Rivera and others 1937). Acid-treated seeds germinated from 51 to 67% in 11 days; final germination ranged from 56 to 67% (Olson and Barnes 1974). Acid treatment for 0, 30, 60, and 120 minutes produced 5, 41, 92, and 96% germination, respectively (Frett and Dirr 1979).

Applying hydrostatic pressure to yellowwood seeds increased their permeability in the region of the hilum and greatly increased the speed of germination (Rivera and others 1937). Pressures of 68,950 kN/m^2 (10,000 lb/in^2) applied for 10 minutes at 0 °C, 1 minute at 25 °C, and 1 minute at 50 °C resulted in 100% germination within 24 days (Rivera and others 1937). At 206,850 kN/m^2 (30,000 lb/in^2) of pressure for 1 minute or 5 minutes at 25 °C, 100% of the seeds germinated by the 12th day. However, a 20-minute exposure at 68,950 kN/m^2 (10,000 lb/in^2) at 50 °C proved to be injurious to seeds, with 15.5% of the seeds appearing soft and dead (Rivera and others 1937).

Nursery practice. Seeds may be sown in autumn or spring. Beds should be well prepared and drilled with rows 20 to 30 cm (8 to 12 in) apart, and the seeds covered with about 6 mm (3 in) of firmed soil. Untreated seeds may be sown in autumn and the seedbeds should be mulched and protected with bird or shade screens until after late frosts in spring. Side boards simplify mulching and screening. Stratified seeds or dry-stored seeds that have been treated to break dormancy are used for spring-sowing. If seeds were soaked in hot water at 49 °C for 24 to 36 hours until swollen and then surface-dried and planted in the nursery, they germinated readily in the spring (Dirr and Heuser 1987). Shading of seedlings is unnecessary.

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Figure 1C*Cladrastis kentukea,* yellowwood: pods, × .5.

Figure 2C*Cladrastis kentukea,* yellowwood: longitudinal view of seed (left), exterior view of seed (right), × 5.

Figure 3C*Cladrastis kentukea,* yellowwood: seedling development at 1, 6, 10, 16, and 20 days after germination.